



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Ambidexterity in managing NPD: balancing speed to market versus quality and innovation. Insights from a case study

Citation for published version:

Bunduchi, R 2008, 'Ambidexterity in managing NPD: balancing speed to market versus quality and innovation. Insights from a case study', Paper presented at EuroMOT 2008, Sophia Antipolis, France, 16/09/08 - 19/09/08.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Publisher Rights Statement:

© Bunduchi, R. (2008). Ambidexterity in managing NPD: balancing speed to market versus quality and innovation. Insights from a case study. In EuroMOT 2008 Conference.

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



EuroMOT 2008

Ambidexterity in managing NPD: balancing speed to market versus quality and innovation.

Insights from a case study.¹

Dr RALUCA BUNDUCHI

University of Aberdeen Business School, Dunbar Street, AB24 3QY, Scotland, UK, e-mail:
r.bunduchi@abdn.ac.uk

Abstract

One of the major dilemmas of innovation management in general, and new product development in particular, is to balance the short term needs for incremental innovation with the long term requirements for radical innovation. This ability, called ambidexterity, creates special challenges in that it requires different and often contradictory structures, processes and cultures within the same organisation. These challenges are particularly elevated in high velocity markets, where the emphasis is on developing dynamic capabilities built around experiential unstable processes. This paper examines the challenges faced by one organisation and its approach to dealing with the demands for ambidexterity when managing NPD. The case study identifies three kinds of trade-offs: (1) the need for structure to speed up market launch versus flexibility to support creativity in development, (2) wide early stakeholder involvement to increase concept quality versus limited involvement to speed up development, and (3) a focus on financially driven post project reviews to enable fast acquisition of explicit knowledge versus building in procedures for continuous learning to support tacit knowledge development.

1. Introduction

One of the major dilemmas of innovation management in general, and new product development (NPD) in particular, is to balance the short term need for incremental innovation with the long term requirements for radical, discontinuous innovation (Birkinshaw & Gibson, 2004). This capability, called ambidexterity, creates special challenges for organisations in that it requires different and often contradictory structures, processes and cultures within the same firm (Tushman & O'Reilly, 1996).

This paper explores the approach taken to organize the NPD process by a business unit of a large telecommunication company. The analysis focuses on three aspects of the NPD process: the overall structure of the NPD process, the involvement of relevant stakeholders early on in the process, and the approach to building learning mechanisms into the NPD process.

The findings show that the organisational unit makes a number of trade-offs to accommodate the conflicting requirements for innovation in a fast changing market: a focus on processual structure to speed up market launch versus a focus on flexibility to stimulate creativity, early involvement of many stakeholders to increase the quality of the product concept versus limiting early involvement to speed up the process; and finally a focus on post project, financial only reviews to enable fast acquisition of explicit knowledge to speed up the process

¹ This research was supported by a grant from the British Academy.

versus building in procedures for continuous learning throughout the process to support tacit knowledge development.

The structure of the paper is as follows. The next section provides a background to the existing literature on NPD capabilities and approaches to build ambidexterity in organisations. Section three described the research methodology employed in this study. Section four discusses the case study data, and the last section identifies and discusses some tentative findings.

2. Dynamic capabilities, ambidexterity and NPD

Effective NPD management is one of the key determinants of sustained company performance (for a review, see Brown & Eisenhardt, 1995; Ernst, 2002). Studies of NPD have shown that firms which are able to develop quickly exciting new products are likely to outperform those that introduce “me-too”, “off-the-mark” products (Brown & Eisenhardt, 1995). As such, product development routines have been identified as one of the key dynamic capabilities in organisations (Eisenhardt & Martin, 2000).

We follow here Teece et al (1997) and Eisenhardt & Martin (2000) in understanding dynamic capabilities as identifiable, specific strategic and organisational processes within the firm. Dynamic capabilities represent processes like product development, alliancing, and strategic decision making that create value for organisations by integrating, reconfiguring and/or gaining and releasing existing resources, so that a new resource configuration is created that adds value to the firm² (Eisenhardt & Martin, 2000). Whether these dynamic capabilities are effective at enabling a firm to generate competitive advantage depends on the dynamism of the market in which the firm operates (Eisenhardt & Martin, 2000). When market dynamism is moderate (i.e. change happens within stable industry structures) dynamic capabilities are complicated processes that rely on existing knowledge and linear execution to produce predictable outcomes aligned with existing structures. When market dynamism is high (i.e. change happens in markets where industry structure is blurring), dynamic capabilities are simple and experiential unstable processes that rely on quickly created new knowledge and iterative execution to produce unpredictable outcomes adapted to the changing structures.

As such, new product development, as any other dynamic capability, should emphasise alignment with current strategy and structure when change is moderate, while supporting the ability to adapt to volatile markets when change is fast. Alignment enables the firm to coordinate and streamline activities to deliver value, while adaptability enables the firm to take advantage quickly of newly emerging opportunities. The ability of organisation to balance alignment with adaptability, called ambidexterity, enables organisations to simultaneously pursue incremental and discontinuous innovation (Tushman & O'Reilly, 1996).

The focus of this paper is on exploring the specific ways in which organisations manage the tensions between adaptability and alignment in NPD, in particular the approach that organisations take to structure their NPD to address these tensions. In this context, ambidexterity can be translated as an ability to balance the need to cut costs by running existing processes efficiently and effectively (alignment with existing structure and strategy) with the requirements for supporting creativity and innovation in its processes (adaptability to changing market conditions which require radical, new innovations) (Backman et al, 2007).

² For example, product development routines allow managers to combine their experience, knowledge and skills to develop new products and services which will be (successfully) commercialised. Product development routines therefore integrate existing resources (managers' experience, knowledge and skills) into a new resource configuration (new product / service) that generates revenues when sold into the market (Eisenhardt & Martin, 2000).

This tension inherent in NPD between efficiency and effectiveness versus creativity and innovation can be identified in a number of different areas of the NPD, ranging from the structuring of the NPD process, the approach to early stakeholders involvement, and the way in which learning mechanisms are built into the process.

2.1. Ambidexterity & the NPD process structure

NPD research has shown that generally, firms which are successful at NPD tend to operate in some form of structured, staging process (Cooper & Kleinschmidt, 1995; Ernst, 2002; Tidd et al, 2005). Structure is important because it enables a formal review of the technical and marketing data at each stage against clear criteria. Strict and formal check point reviews improves product delivery time management (Cooper et al, 2003) in two ways: (1) by strict control over the project execution schedules it enables on time delivery and, (2) by avoiding costly mistakes to be carried forward into the process it speeds up delivery time. Both on time and faster delivery are associated with product profitability (Brown & Eisenhardt, 1995). For example, the consequences of delays in product development have been shown to be much more significant on product profitability than the consequences of overspending (Fortune, 1989), while faster development process leads to less time to product launch (Brown & Eisenhardt, 1995), which means that such firms can incorporate more up to date technology in their products and respond faster to emerging market niches and changes in market requirements (Gupta & Wilemon, 1990) which leads to higher profitability.

However, such benefits are obtained at the expense of developing radically new products (Backman et al, 2007). Companies (successfully) developing radical innovation have been found to follow a NPD process which allows for higher degree of technology uncertainty and much longer development times (Veryzer, 1998). Consequently, simply having a formal, structured NPD process in place is not enough to ensure product profitability. One of the most common pitfalls that firms encounter when using a formal process, is that rather than becoming a template to guide product development, the process becomes beset with bureaucracy and rigid. To ensure that the benefits of structure are achieved in product development and that creativity and innovation is not stifled, the process should be scalable and flexible to accommodate the development of different kinds of products (Cooper, 2006; Cooper & Kleinschmidt, 1996). As such, in developing product development routines, organisations need to balance process order and control emphasised when the organisation adopts a linear stage gate model process with process instability and creativity emphasised when the organisation adopts a recursive, chaotic approach to structure its NPD processes. In this chaotic view, the stages overlap, creating fuzziness and disorder in the process. An ambidextrous organisation should be able to switch between linear and chaotic NPD structures to produce corresponding innovations that range from incremental to radical (McCarthy et al, 2006).

With few exceptions that deal with the approach to build radical innovation (McCarthy et al, 2006; Veryzer, 1998), most of existing research focuses on the structures to support incremental innovation. The arguments for scalable and flexible process to support both radical and incremental innovation are based on large scale survey asking firms to self rate their own approach to NPD structure (Cooper, 2006; Cooper & Kleinschmidt, 1996), and do not offer any insight into how these scalability is really achieved in practice.

2.2. Ambidexterity and early involvement

Organisations which allow for the involvement of relevant stakeholders early on into their NPD process have also been shown to be more successful at commercialising new products (Brown & Eisenhardt, 1995; Cooper & Kleinschmidt, 1995; Ernst, 2002). Early involvement is important because it enables decision makers to take into consideration a wide range of requirements and inputs before irreversible commitments are made. For example, including

R&D, marketing, engineering and manufacturing early on into the NPD process helps defining product requirements before too much money have been spent (Gupta & Wilemon, 1990), which reduces the need to make costly changes to product design later in the process. Early involvement of customers generally enables better alignment of the product concept with customer requirements (Ernst, 2002), improving the quality of the product concept, while early supplier involvement helps reducing the complexity of the design project and alerts the project team to potential downstream problems early on (Brown & Eisenhardt, 1995) speeding up the process. Moreover, closer ties with suppliers earlier on when developing products requiring new technological capabilities improves product quality (Primo & Amundson, 2002). As such, early involvement avoids wasting resources and improves product concept quality concept (Tidd et al, 2005) increasing the chances that the final product will be successfully commercialized. Early involvement has also been shown to support innovation and creativity by encouraging interaction between different departments as early as possible into the process which leads to more creative product ideas (Backman et al, 2007). As such, it appears that early involvement supports both alignment and adaptability.

Nevertheless, encouraging wide participation early on into the product development increases the time spent at the front end of the process. Companies often tend to push for manufacturing as soon as possible in order to respond to pressures for speedy development and early introduction, especially when operating in dynamic markets, where products have very short life cycles.

Consequently, the tension here is not only between alignment (to push for fast development) and adaptability (to develop creative products), but also within the ways in which alignment is achieved: to push for fast market introduction by reducing the time spent early on into the process, or to avoid the likelihood of spending more time and resources later into the process by increasing the time spent early on to detect any possible mistakes regarding product concept design.

2.3. Ambidexterity and learning

The ability to learn leads to competitive advantage by supporting a flexible and adaptive organisation that can change fast in response - or even in anticipation of - changes in the market. Such a capability becomes a critical dynamic capability for organisations operating in highly dynamic market as it enables the organisation to adapt fast to rapid and unpredictable changes in the market (Teece et al, 1998). In what concerns NPD, learning is essential to enable the organisation to cope with the challenges posed by radical and incremental innovation alike (Tidd et al, 2005).

During the NPD process, learning can happen in different ways, either within a structured, formal approach for example via post project reviews, or via a more flexible, informal avenue such as building in procedures into the process to enable continuous learning (Tidd et al, 2005).

There is a lack of consensus regarding which approach is best to support incremental or radical innovation. For example Tidd et al (2005) argues that structured learning via post project reviews helps to capture and codify the specific learning points into explicit procedures which will move the organisation forwards in terms of developing new products in the future. Therefore, such reviews are best suited for distinct projects – e.g. for the first product based on a new kind of technology or developed using a new kind of process approach (i.e. radical innovation) – where the difference in products / projects is significant³,

³ Here, the ability to integrate effectively into procedures the learning points raised at the post project reviews requires a commitment to open and informed review (Tidd et al, 2005).

and less useful for the smaller scale, regular incremental product innovations where procedures to support continuous learning would be more appropriate.

In contrast, Agger & Segrestin's (2007) study of the Laguna II project found that reliance on structured and formal techniques to support, detect and solve problems and support learning is efficient when the project deals with incremental innovation. Such formal techniques were found to fail to facilitate learning when the company was faced with radical innovation. As such, structured approaches to learning in the form of post project reviews would seem more appropriate to support incremental, rather than radical new product development.

3. Research methodology

This study follows an interpretative research (Walsham, 1995) approach based on an instrumental case study research design (Stake, 1995). The organisation under study – MobileAcs – is an organisational unit part of a large telecommunication company. The telecommunication company is one of the largest handset producers in the world. MobileAcs focuses on the development of mobile phone accessories. This paper is part of a larger study exploring the activities and competencies involved in NPD in firms operating in high-tech, high velocity markets.

Data collection was based on semi-structured interviews, using a generic interview guide (see appendix). The semi-structured nature of the interview enabled the researcher to maintain some structure in the research process, while following the tenets of the interpretive research and providing access to the participants' views and interpretations of actions and events (Walsham, 1995). Ten in depth interviews were conducted in October 2007 with members of R&D department in MobileAcs including five members of the management team (i.e. the head of the business unit, together with the managers responsible for the R&D Software, Technology, Quality and the head of the R&D Software unit in the location where the interviews took place), one program manager (in charge of the product team), one product development manager, one software engineer, one representative from business development and one from the sourcing department.

The interviews varied in between one and three hours. The interviews were tape recorded, and notes were taken during the interviews. The findings presented in this paper are based on the notes taken during the interviews.

The interview data is supplemented with secondary data including documents, news and reports that are publicly available about the parent organisation, the unit and the market in which the unit operates.

Open coding (Strauss & Corbin, 1990) was used in the first instance for data reduction. Coding followed a deductive approach (Miles & Huberman 1994), as an initial list of codes was developed based on the categories that emerged as relevant from the literature review. The initial list of codes included constructs such as the NPD process characteristics (i.e. NPD structure, early involvement and learning, each with subcategories). Following Miles & Huberman (1994) recommendation, the analysis of the interviews was based on case narratives. The result of these narratives is discussed below.

4. NPD process in MobileAcs

4.1. Context

At the time of the study, the accessories unit was part of the organisation's handset business group. MobileAcs is a relatively small unit within the parent organisation involving cc 200 people. This size limits the resources available to support NPD, which are mentioned as one of the most common constraint on the NPD process.

The products developed by the MobileAcs unit include mobile phone accessories such as Bluetooth headsets, memory cards and cable connections. Comparing with the handset market, the market for accessories is much more dynamic, with very short product development cycles. For accessories producers, this translates into a fast, agglomerated approach to NPD with a large number of short lived products simultaneously under development.

Mobile phones and accessories products share a symbiotic link. On one hand, the expanding multimedia feature in the new high-end feature rich phones such as Nokia's NSeries and Motorola's Razor has generated significant growth of the mobile phone accessories market in the past years. On the other hand, to increase the sales of high-end mobile phones and smartphones, handset producers need to provide more and better accessories that allow users to benefit fully from the multimedia features provided in these phones. Consequently, according to a recent report published by ABIresearch, the accessories market as a whole is expected to grow steadily over the next five years, generating more than \$80 billion in 2012 (ABIresearch, 2007).

Within the MobileAcs' parent organisation, the current strategy is to pursue both strategic objectives: higher market share and profitability in the accessories market (at the organisation level) and higher market share in their high end handset market by aligning the accessories products with their handset products (at MobileAcs unit level). This strategy has significant implications on NPD within MobileAcs. To achieve the first objective, accessories products are developed relying on standard interfaces that enable interoperability with the competitors' products. To achieve the second objective, significant efforts were made over the past two years to achieve a strong alignment between the handset and the accessories products by aligning the NPD structure and organisation between the accessories and the handset unit.

4.2. NPD process in MobileAcs

4.2.1. "Stage Gate" Process

In MobileAcs the overall development time is very short, varying between 1-3 months for simple, variant products up to maximum 12-13 months for complex new type of products. The average development time is 6 months. Speed to market is a key driver of product development due to the dynamic nature of accessories market which is characterised by hectic demand and short product development life cycles. According to the respondents, short product development cycles have two significant impacts on their NPD process. First, short development cycles accelerate the pace of decision making as fast decision making mitigate the risks of operating in a hectic environment⁴. Second, short development cycles aggravate the negative impact of delays in product development time as customers tastes change fast⁵.

Due to these perceived effects of short development cycles, MobileAcs has made a significant effort over the past two years to reduce the development time and ensure on time delivery by implementing a new approach to NPD process that follows a structured, staging approach. The management team has laboured hard to ensure strict adherence to the new process. As a result, in the past two years the unit achieved "0 slip" – i.e. no delays – in project execution in software.

⁴ As one interviewee explained, it is better to take a wrong decision fast and then correct it along the way, than delaying taking the decision in the first place. The reason for this is that more risk can be taken into the product as the level of investment per product in accessories is relatively small (vis-à-vis with developing a handset). Lower investment fosters a culture that is tolerant of failure.

⁵ In fast changing markets, customers' tastes change fast and the window of product launch is very short. However, fast development cycles also means that resources are freed earlier and (more) new products can be developed which reduces the risks at the level of the program, as new products can be rapidly launched to address the fast changing needs.

The “milestone approach” (see table 1) includes six review points which can be split into two stages: first, the pre-development stage includes⁶ concept generation (M1) and product concept selection (M2), and the actual development stage that includes product definition (M3), product specification and execution (M4), certification (M5), mass production & delivery to customers (M6) and operation ramp-up (M7).

⁶ To assure confidentiality, the actual names of the milestones are replaced with milestone 1 etc.

Table 1. *NPD process in MobileAcs*

MILESTONE	ACTIVITIES	FUNCTIONS INVOLVED	REVIEW CRITERIA
M1 – generic	Identify user needs based on company wide market research, based on which the product manager develops an idea concept Idea concept is discussed at monthly cross-functional workshop	Product management Management Team Cross functional workshops:	<input type="checkbox"/> Business case (developed based on an organisation – wide template) <input type="checkbox"/> Portfolio fit (assessed based on a organisation and unit based template) <input type="checkbox"/> Cost requirements (assessed based on the R&D requirements) <input type="checkbox"/> (management) intuition
M1.1 – new, complex products	During the cross-functional workshop, the team assesses the idea concepts in terms of: <input type="checkbox"/> technology knowledge requirement <input type="checkbox"/> fit with the existing portfolio pf products <input type="checkbox"/> alignment with the handset products Technology scouting begins Product abstracts are developed which include the key selling point. Business and market case are developed. A pre-study of the product concept is developed by the R&D (either software or mechanics depending on the nature of the product) Industrial design begins	<input type="checkbox"/> Product managers <input type="checkbox"/> Area product managers <input type="checkbox"/> Business Development <input type="checkbox"/> Industrial design <input type="checkbox"/> Mechanical design (R&D) <input type="checkbox"/> Line managers from Software & Hardware (R&D) Technology scouting	
M2	Concept is refined , and specifications are included for management => build a feasibility study Product program manager is nominated which starts product definition and builds a cross-functional Product Team. Identify requirements Look for possible suppliers & discuss their requirements (depending on supplier)	Product management Program manager leading the Product Team: <input type="checkbox"/> Product Development Manager <input type="checkbox"/> Software Leader <input type="checkbox"/> Hardware Leader <input type="checkbox"/> Mechanics Leader <input type="checkbox"/> representatives from Sourcing & Customer Care <input type="checkbox"/> Quality	
M3	Requirements freeze as actual development begins Product definition: clarify product specification, define the features, clarify resources, select suppliers, identify risks , construct the time schedule and set key drivers Design the product mechanical design Begin product implementation		
M4	Product specification & execution – at this point the specification is ready Some implementation work => 1 st sample of product implementation is obtained based on which the 1 st verification of the product is undertaken		
M5	Begins product certification , as the implementation work is ready => Final verification involving testing and quality to improve implementation Product freeze – as suppliers get the authorization to begin manufacturing		Very rarely killed after M3 – one example of an attempt of assassination - unclear project definition, but done in collaboration with the handset unit
M6	Mass production & delivery to customers		
M7	Sales & ramping up – signifies the end of product development	Product management, + Program Manager	

This “milestone process” caters for a front end approach based on the realisation that the quality of work before investment is committed at M3 improves the chances of product success. MobileAcs spends cc. 20-30% of time and resources during the early stages to identify product ideas and to develop specifications before actual product development starts. Such a front end approach enables a thorough analysis of the product concepts against clear commercial criteria (i.e. the business case) before irreversible commitments are made. As such, the unit hopes to identify all potential mistakes early on, when the cost of correcting them is lower, and to make sure that resources are not wasted on products that should be killed.

While the overall NPD activities, milestones and criteria are the same for all types of products, variations do exist depending on the degree of complexity involved in product development. For example, stage M1.1. is conducted only for the development of new, complex products, while the time and resources spent during the M1 and M2 milestones for the development of new products is significantly higher than for the development of variant products. Consequently, the overall delivery time depends on the type of product under development, with more time and resources spent earlier on in the process for new, more complex products.

Complexity in product development is directly related to the “newness” of the product. The development of *new* products - *new to the firm* rather than new to the world - requires the accumulation and development of new knowledge both in terms of the technical specification of the product and in terms of the coordination of the activities involved. As it can be seen in Table 1, complex new products require additional knowledge intensive activities during both idea generation (M1-M2) and actual development stage. At the idea generation stage, these additional activities include the development of the industrial design, the acquisition of market intelligence via market analysis and feasibility studies, and conducting extensive legal studies. During actual development, R&D engineers need to acquire the necessary technical knowledge to develop the new product. Complex new products also require more extensive coordination, for example a new product team needs to be set up, suppliers need to be identified and contracts need to be negotiated. In contrast, the development of variants of existing products generally involves only the reconfiguration of existing knowledge, as variant products do not require extensive market and legal analysis, generally involve the same team and use the suppliers as the original product, while the software engineers rely on existing technical knowledge to coordinate implementation.

These variations in the process accommodate the development of different product types, allowing the unit to build in flexibility into the NPD process while achieving the speed and efficiency benefits arising from having a clear and formal structure.

In conclusion, MobileAcs built its product development around a “stage gate” process with clearly defined check point reviews (milestones) that enable the control of both resource allocation and delivery time management. As a result, the unit has achieved an impressive “0 slip” in product delivery, aligning the NPD process to the needs for fast product development and early introduction that characterise the mobile phone accessories market. At the same time the process seems to be easily scalable to accommodate varying degrees of complexity in product development by varying the amount of time spent during the early stages of the process. As such, the unit allows for more time to be spent on developing complex new products which require more extensive knowledge acquisition (to support the development of both marketing and technology competencies) and more intensive coordination of the different activities and resources involved in the process.

4.2.2. Early involvement

MobileAcs adopts a cross functional approach both for idea generation and for the actual product development (see Table 1). During the idea generation stage, product ideas are discussed during a cross-functional workshop including representatives from industrial and

mechanical design, product managers and business development and area product management. The technology side is also brought early on into product development to work together with the business development on getting the project definition before development begins at M3. The involvement of all relevant functions helps to increase product concept quality during idea generation. Cross-functional involvement also nourishes creativity during the early stages of product development by bringing in different perspectives into the idea generation process. During the actual development phase, the cross-functional product team set up to transform the idea into a final product enables NPD managers to access a more diverse range of information which aids decision making. The use of cross-functional teams from the early stages of the NPD process facilitates early involvement of all the relevant internal functions into the process, which is a contributing factor to the achievement of the 0 slip target in product delivery.

Early cross-functional involvement is constrained by resource limitations. For example, having a dedicated R&D representative working with business development on idea generation would have improved the quality of the concept, but could not be achieved as it would place too much strain on the already stretched R&D resources.

While the unit was making efforts to support early cross-functional linkages, little emphasis was placed on bringing in external stakeholders early on during concept idea generation and product concept selection.

In MobileAcs, suppliers are chosen once the concept is selected. Consequently, their ability to participate during the early stages of concept generation is limited. Consultation with suppliers concerning product specifications and/or plans for the development of new products occurs only with strategic technology suppliers. There was however evidence that some discussions of product specifications do happen before development starts with some suppliers (see Table 1), depending on their competencies and on the nature of relationship, in particular the degree of collaboration. For example suppliers in joint R&D mode (where the product is developed in close collaboration with suppliers) tend to be much more involved in product specification and in the actual development than suppliers in OEM mode (original equipment manufacturer) which are required to simply supply the (typically standard) components for the product.

There is no involvement of customers during the early stages of product development in MobileAcs for products targeted to the end user market. End user requirements are elicited using user case scenarios developed at the parent organisation level. There is only limited involvement of users later on during the implementation of the product when prototypes might be tested using focus groups. In contrast, there were however indications that for products developed for organisational buyers there is significant user involvement early on in the development process to elicit user requirements and clarify product specifications.

In summary, resource limitations constrain early cross-functional involvement, the efforts to develop early linkages with suppliers are generally limited to strategically important suppliers, and no attempts are made to include end customers into the early stages of product development. Such an approach enables the unit to reduce the time and resources spent on the early stages of the process, but it ultimately means that it misses opportunities to avoid the need to make compromises later on into the process that reduce the quality of the product and could increase the time to delivery. The emphasis here – especially in what concerns early involvement of external stakeholders – seems to be on alignment to the current needs for speed and early introduction, rather than on building in the mechanisms to support high quality in product design. Nevertheless, despite the resource constraints, the early cross functional approach to idea generation and selection does encourage creativity and innovation in product concept development. Remarks were made that the cross functional approach led to a significant increase in the number of ideas generated (although there is no indication regarding the quality or novelty of these ideas).

4.2.3. *Effective learning*

According to our respondents, in MobileAcs learning relies primarily on post project reviews – the post project “lessons learnt” sessions hold after ramp up. The length of the review varies depending on the type of project – up to one day for new products versus half a day for variant products. Time constraints on the process were mentioned as the reason for shorter review sessions. In both cases however, the review focuses almost exclusively on the financial assessment of the products. The assessment is done by the Sales department using information such as failure rates, estimates versus actual sales, and sales comparison.

On the positive side, the financial assessment is done against the original targets in particular the financial forecasts, the product analysis plan and the market plans. Such a structured approach enables the project to be examined against clear criteria (e.g. the degree to which objectives were met, the things which went well and those which could be improved), which supports the acquisition of explicit knowledge.

All respondents agreed that working relationships are based on openness and mutual trust. Communication is frequent and informal which supports open information sharing. A trusting and open environment enables people to have enough confidence to identify the problems and enough trust not to pass the blame around. As such, the right conditions exist for the post project reviews to capture explicit knowledge.

Learning is also facilitated by the short development cycle which characterises NPD process in MobileAcs. Short development cycle means that the same team is generally involved in all development stages. As a result, the effect of every decision is seen directly by the people involved within a short time frame. Such a fast and direct feedback on decision making was mentioned as a critical condition that enables better learning between different products and projects. This situation was contrasted with the experience that respondents had working in other parts of the organisation (e.g. handsets or infrastructure technology) where long(er) development cycles meant not only that significant time was passing between the moment when an action was taking and the moment when the result of that action (in the form of product success) was observable, but also that the team composition changed and different people were involved at different stages in product development. Such a longer and more diluted feedback on particular actions was not seen as inducing to learning.

On the negative side, the over-reliance on financial data limits the ability of the reviews to enable effective learning, in particular the acquisition and dissemination of tacit knowledge. Non financial input into product review evaluation is limited to informal feedback from Sales concerning the usability of a product feature and from websites where the product is reviewed. Moreover, this information generally feeds back to R&D only via informal channels, so there is no formal way of capturing and codifying these learning points via explicit procedures.

The post project reviews are adequate for capturing knowledge from large, radical project, and much less useful for the smaller scale, regular incremental product innovations which represent the majority of NPD projects in MobileAcs. Moreover, the sheer number of the different kinds of products under development⁷ exponentially increases the amount of information generated during the review sessions. Such information overload was repeatedly mentioned as the primary reason why there is little reuse of information between projects⁸. Information overload, coupled with time pressures to speed up development, undermines the ability of post project reviews to support inter-projects learning.

⁷ At any time, there are in between 50-70 of such small scale, incremental products under development with different suppliers set up, different product teams and different characteristics.

⁸ For example one common complaint was that the requirements management is handled on a case to case basis despite the fact that there are different similar projects with similar requirements.

In conclusion, by and large MobileAcs relies almost exclusively on the Sales' financial follow up of the project during the post project reviews to support learning. Such an approach focuses on capturing explicit knowledge which can be easily codified (for example in terms of product features and sales), but inhibits the ability to capture tacit knowledge (for example in what concerns the management and coordination of the NPD process). Moreover, the unit engages mostly in incremental rather than radical new product developments, which makes the choice for post project reviews less appropriate to support learning between similar projects.

4.3. Discussions

The case study traced the approach to NPD as the unit was attempting to develop product development routines that would enable it to accommodate the demands of a fast changing, dynamic market. The analysis identified a number of trade-offs that the unit had to make to accommodate the demands for ambidexterity:: structure versus flexibility, wide versus narrow early involvement, and an emphasis on explicit versus tacit knowledge development.

4.3.1. Structure versus flexibility

The NPD process follows a "stage gate" approach with clearly defined review points which enables the unit to achieve both fast and on time delivery and the efficient allocation of limited resources. While the process is scalable and more time is allocated during the early stages of development for new products to support the development of innovative products, the overall focus of the process remains still on increasing the speed to market. The explanation can be found in type of market in which the unit operates. The dynamic nature of the mobile accessories market with extremely short product life cycles and fast shifting customer demands means that fast and on time delivery becomes a strategic target for NPD to enable the unit to react to fast changing market demands. The downside is that while delivering competitive advantage, fast product delivery may lead to the development of technologically inferior products and can increase the pressure on resources. Research has found that the introduction of technologically sophisticated products requires more time to digest and analyse technological problems (Karlsson & Ahlstrom, 1999), while faster product development cycles mean that resources are freed earlier and more new products can be developed which, paradoxically, places more pressure on resources (Cooper & Edgett, 2007).

In implementing their NPD process, the unit manages to partially balance speed to the market and early introduction with the need to allow the time to introduce more innovative products. However, time and resources remain powerful constraints during the process, focusing product development on alignment rather than adaptability to radical changes. Such constraints limit the ability of the unit to engage in radical product development which relies on new kinds of technologies. Adaptability would require the unit to change the focus of NPD process from (fast) development of products relying on existing technologies to some (time consuming) development of new, different type of products that incorporate new and/or sophisticated technologies. It is the later type of products that would enable the company to move into new strategic product areas where it currently lacks the required technological capabilities.

4.3.2. Wide versus narrow early involvement

Most of the efforts to support early involvement concentrate in MobileAcs on involving the different departments early on into the process, with limited attention paid to external stakeholders. Limited supplier involvement means that opportunities to improve product definition and cut product complexity are missed, but it also recognises that too wide involvement leads to wasted resources and delays in the process. Consequently, the unit chooses to bring in a limited group of (strategic technology) suppliers which are best positioned - both in terms of their technological competencies and of their ability to

contribute to the development of the product due to their close, tight relationships with MobileAcs - to improve the quality of product design. In this way, a compromise is reached between the resource and time constraints on one side and product design quality on the other. The focus is again on alignment to existing conditions (i.e. emphasising speed and early introduction), with some concessions made to building in the ability to adapt to changing requirements by relying on a small number of highly “relevant” suppliers (i.e. those that are best positioned to contribute to the development of new technological competencies that the unit requires to support radical new product development).

While early supplier involvement is limited, there is practically no end customer involvement early on into the process. User definition relies exclusively on secondary market data. While the reliance of generic market research reduces the costs and time involved in the early stages of NPD, it also misses opportunities for understanding fast changing user requirements (which is especially important in a market as dynamic as the phone accessories market). Bringing lead users inside the process would enable the unit not only to react fast to changes in market demands, but most importantly to anticipate these, especially in new areas that the unit might want to target and where the existing market research might prove inadequate.

There are two types of trade offs that can be identified here. First, it is the trade off between a too wide and a too narrow early involvement of (external) stakeholders to support creativity and innovation versus speed in incremental product development. Second, to address the requirements for ambidexterity in a dynamic environment, the unit trades off internal versus external stakeholders involvement. More resources and time are dedicated to the early stages of the process to support wide, cross-functional (internal stakeholders) involvement which facilitates creativity and provides the space required to develop new, different and occasionally radical product idea concepts. Vis-à-vis internal involvement, external involvement is seen as more expensive (i.e. time consuming) and is perceived as less beneficial (especially in what concerns the contribution the end customers might have to product concept generation and development).

4.3.3. Explicit versus tacit knowledge development

The ability of an organisation to learn from its successes & failures is critical in that it improves the adaptability and flexibility of the NPD process and helps generating competitive advantage. Such learning capability is essential for organisations operating in fast changing markets. In MobileAcs, learning happens mostly via post project reviews and focuses almost exclusively on the financial assessment of the project. As such, the unit can capture and codify only explicit knowledge, rather than tacit, implicit knowledge which offers the richest source for learning and innovation. Moreover, the almost exclusive focus on financial assessment limits the range of specific learning points that can be raised during the reviews. Two avenues would be possible here to improve learning. First, the unit needs to move from simple financial auditing to more comprehensive reviews (Tidd et al, 2005) to enable effective learning. Second, learning routines for continuous improvement should be built into the process to capture tacit knowledge which escapes the formal, structured approach followed during post project reviews. While the financial focus was not perceived as a downside, the limits of post project reviews in capturing tacit knowledge and supporting learning were acknowledged by most of the respondents involved in such projects, and were especially evident to the team members (rather than to senior managers). One suggestion to address this problem was to move people around different teams. Job rotation has the advantage that it facilitates the dissemination of tacit knowledge (the major problem with post project reviews), as it enables close personal interaction with experts and helps building personal networks, which are essential to acquire and disseminate tacit knowledge throughout the organisation (Lubit, 2001).

In MobileAcs, learning is the area where the unit appears to make the least efforts to achieve ambidexterity. Building in post project reviews which rely exclusively on financial information could benefit the acquisition of explicit knowledge for new products. The small size of the unit also appears to facilitate the development of strong personal networks that facilitate the dissemination of tacit knowledge. However, time pressures and a very large number of incremental projects means that there are little efforts made to support learning between different incremental projects. Moreover, no formal attempts were mentioned to support tacit knowledge development across different product teams. The trade off here is between spending time and resources to develop learning mechanisms which might benefit future projects, especially in what concerns the acquisition and dissemination of tacit knowledge, and the focus on developing the current (mostly incremental) products on time and on budget. Limited time and resources and a very large number of products simultaneously under development place a considerable strain on the process and it focuses the attention on current product work rather than on finding ways to link different projects together, reuse information, provide feedback and generally build in learning mechanisms. This is unfortunate as learning would enable the unit to take advantage of the experience curve to speed up the process. This would release the resources and time pressures and would enable the unit to build some slack into the process to encourage creativity and innovation to support radical product development.

5. Conclusions

This paper set out to explore the challenges of dealing with the demands for ambidexterity when managing NPD. These challenges were explored using a case study at the level of the NPD structure, the approach to early involvement and the type of learning mechanisms built into the process. The case study revealed a number of possible trade offs between the speed and sustainable product innovation.

First, while building in structure in the NPD process enables organisations to keep a tight control over the delivery time, fast product delivery may lead to the development of technologically inferior products, can increase the pressure on resources, and inhibits creativity which requires a more flexible environment. As such, organisations need to balance structure versus flexibility to achieve a compromise between the need for fast and early product introduction vis-à-vis need to allow the time and provide the resource to introduce innovative new products.

Second, on one hand, restricting the involvement of stakeholders early on into the process reduces the costs and time involved in the early stages of NPD reducing the time till the actual development begins. On the other hand, limited involvement limits the amount of information available early on to develop the product concept which translates in poorer design, limited understanding of fast changing user requirements, and ultimately means that mistakes that could be avoided early on are carried in the later stages increasing the overall delivery time. The main trade off here is therefore between the need to involve a wide range of stakeholders early on into the process to increase product design quality and support the development of innovative new products versus the need to limit the amount and extent of such linkages to speed up the process and save resources during the development of incremental products.

Finally, learning using post project reviews and relying on financial information enables the unit to capture explicit knowledge that is easily codified into procedures and have a direct and easy to understand impact on success (i.e. product sales). Emphasis on continuous learning procedures which are built into the process is time and resource consuming, but it enables the organisation to capture tacit knowledge which provides the richest source for learning and innovation. Organisations operating in dynamic, fast changing markets have to trade off the time pressures with the need to support effective learning, in particular tacit learning which enables them to be adapt fast and to learn to pre-empt the changes in their environments.

The methodology adopted here enabled us to explore the trade offs that MobileAcs made, however it precludes us from generalising to other kinds of organisations. The focus of this in depth, qualitative research has been to explore the organisational efforts to build ambidexterity in their NPD process, with further research required to map these efforts across organisations. One conclusion that could be however drawn from this case study is that the choice between the different trade offs should be driven by the overall strategy and will dictate whether the focus will be on short term development (fast, early introduction of new products to support sales) versus long term research (time consuming efforts to support the investment in radical, innovative new products). These trade offs determine the balance between the idea generation (research) and the actual development (product development) within the NPD process. In our case, the pressures for short term development won. When asked about the balance between research and development in the R&D in MobileAcs, the head of the business unit answered: “1% research and 99% development”.

6. References

- ABIREsearch (2007) *Mobile Phone Accessories*, released 2Q 2007, available at http://www.abiresearch.com/products/market_research/Mobile_Phone_Accessories
- Aggeri, F. & Segrestin, B. (2007) Innovation and project development: an impossible equation? Lessons from an innovative automobile project development, *R&D Management*, 37(1), 37-47
- Backman, M., Borjesson, S. & Setterberg, S. (2007) Working with concepts in the fuzzy front end: exploring the context for innovation for different types of concepts at Volvo Cars, *R&D Management*, 37(1), 17-28.
- Birkinshaw, J. & Gibson, C. (2004) Building Ambidexterity Into an Organization, *MIT Sloan Management Review*, 45(4), 47-55.
- Brown, S. L. and Eisenhardt, K. M. (1995) Product Development: Past Research, Present Findings, and Future Directions, *The Academy of Management Review*, 20(2), 343-378.
- Cooper, R.G. (2006) Formula for Success in NPD, *Stage Gate Inc.*, March/April 2006, Document reference no.23, available at www.stage-gate.com
- Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J., (2003) Best Practices in Product Innovation: What Distinguishes Top Performers, *Product Development Institute*; available at www.prod-dev.com
- Cooper, R.G. and Edgett, S.J. (2007) Overcoming the Current Crunch in NPD Resources, *Product Development Institute*, available at www.prod-dev.com
- Cooper, R.G. and Kleinschmidt, E.J. (1995) Benchmarking the firm's critical success factors in new product development, *Journal of Product Innovation Management*, 12(5), 374-391.
- Cooper, R.G. and Kleinschmidt, E.J. (1996) Winning Businesses in Product Development: The Critical Success Factors, *Research & Technology Management*, 39(4),
- Eisenhardt, K.M. & Martin, J.A. (2000) Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10-11), 1105-1121.
- Ernst, H. (2002) Success factors of new product development: a review of the empirical literature, *International Journal of Management Reviews*, 4(1), 1-40.
- Fortune Magazine, 2nd of February, 1989, “Speeding New Ideas to Market”, pg. 54-59
- Gupta, A.K. and Wilemon, D.L. (1990), Accelerating the Development of Technology-Based New Products, *California Management Review*, 32(2), 24-44

Karlsson, C. & Ahlstrom, P. (1999) Technological Level and Product Development Cycle Time, *Journal of Product Innovation Management*, 16(4), 352-362.

Lubit, R. (2001). Tacit knowledge and knowledge management: The keys to sustainable competitive advantage, *Organizational Dynamics*, 29 (3), 164-178.

McCarthy, I.P., Tsinopoulos, C., Allen, P. and Rose-Anderssen, C. (2006) New Product Development as a Complex Adaptive System of Decisions, *Journal of Product Innovation Management*, 23(5), 437-456.

Miles, M.B. & Huberman, A.M. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks: Sage Publications, 1994.

Primo, M.A.M. & Amundson, S.D. (2002) An exploratory study of the effects of supplier relationships on new product development outcomes, *Journal of Operations Management*, 20(1), 33-52.

Stake, R. E. *The Art of Case Study Research*. Thousand Oaks: Sage Publications, 1995.

Teece, D. J. et al. (1997) Dynamic capabilities and strategic management, *Strategic Management Journal*, 18(7), 509-533.

Tidd, J. et al. (2005) *Managing Innovation*, 3rd edition, Chichester: John Wiley & Sons.

Tushman, M.L. & O'Reilly, C. (1996) The Ambidextrous Organisation. Managing Evolutionary and Revolutionary Change, *California Management Review*, 38(4), 8-30.

Veryzer, R.W. (1998) Discontinuous Innovation and the New Product Development Process, *Journal of Product Innovation Management*, 15(4), 304-321.

Walsham, G. (1995). Interpretive case studies in IS research. Nature and method. *European Journal of Information Systems*, 4(2), 74-81.

Zirger, B.J. & Maidique, M. (1990) A model of new product development: An empirical test. *Management Science*, 36(7), 867-883.

Appendix: Interview guide

A. Background / Overview of the project:

1. Could you describe the unit you work for & your role (in terms of organisational structure, number of employees, your role & responsibilities)
2. Could you describe a (typical) NPD project (in terms of your role and differences between developing new versus existing types of products)

B. Activities & competencies involved:

3. Could you describe the activities & milestones involved in the NPD process? (in terms of activities involved, criteria used, time required, departments involved, suppliers, organisational differences with the organisational wide process, process structure, support tools used, and mechanisms to evaluate the process)
4. How is the relevant knowledge (technological & market) acquired / developed? (in terms of knowledge acquisition processes, links with research centre)
5. What is involved in the launch of a new product? (in terms of timing and extend of marketing department involvement, differences between new versus existing kinds of product, types of market testing)
6. What is involved in the sourcing of new products? (in terms of timing and extend of sourcing department involvement, types of suppliers and supplier relationships management, differences between new versus existing kinds of product)

7. If you look at the NPD process, is there anything that could be changed/improved?